

1 HOUSING ASSEMBLY WITH BEVELED RETAINERS FOR INSTALLATION IN  
2 A WINDOW FRAME

3 ~~CROSS REFERENCE TO RELATED APPLICATIONS~~  
4 ~~Not Applicable~~

5 ~~STATEMENT REGARDING FEDERALLY SPONSORED~~  
6 ~~RESEARCH OR DEVELOPMENT~~  
7 ~~Not Applicable~~

8 BACKGROUND OF THE INVENTION

9 This invention relates generally to the field of  
10 window hardware and specifically to a tilt latch or pivot  
11 housing.

12 Double hung windows are provided with counterbalances  
13 for maintaining a sash in an elevated position. Springs or  
14 weights connected to the sash act as the counterbalance.  
15 Many window sashes are adapted for tilting inwardly for  
16 cleaning. The sash tilts on a pivot assembly at the bottom  
17 of the sash. Spring operated tilt latches at the top of  
18 the sash retain the sash in the vertical position and are  
19 released for pivoting of the sash. Latches, generally tilt  
20 latches, are shown, for example, in U.S. Patents Nos.  
21 4,837,975 to Simpson, 4,901,475 to Simpson, 4,167,835 to  
22 Nobes, 4,578,903 to Simpson, 4,475,311 to Gibson, 4,955,159  
23 to Rogers, 4,869,020 to Andres, 4,961,286 to Bezubic,  
24 4,790,579 to Maxwell, 4,553,353 to Simpson, 4,400,026 to  
25 Brown, 4,791,756 to Simpson, 4,320,597 to Sterner,  
26 4,640,048 to Winner, 4,622,778 to Simpson, 4,624,073 to  
27 Randall, 4,669,765 to Ullman, 5,301,989 to Dallmann,  
28 5,028,083 to Mischenko, 5,096,240 to Schultz, 5,127,685 to  
29 Dallaire, 5,165,737 to Riegelman, 5,014,466 to Winner, and  
30 5,139,291 to Schultz, all of which are incorporated herein  
31 by reference.

09152458-091493

09152458.091498

1 Figs. 10 and 11 show a prior art tilt latch housing.  
2 A housing 250 includes a bottom wall 254, side walls 256, a  
3 rear wall 258, and a top wall 260 defining a hollow cavity  
4 262 opening at a front end of the housing. The top wall  
5 260 defines a flange 264 at the top of the side and rear  
6 walls 256, 258. Retainers 261 project from the side walls  
7 256 and rear wall 258. Each retainer is flared, that is,  
8 the retainer slopes outwardly from the wall to a lip 269  
9 that defines a catch for engaging edges of a notch in a  
10 header rail of a sash. The space between the lip 269 and  
11 flange 264 defines a gap or short groove 263 for receiving  
12 an edge of the sash therein. A bottom retainer 270  
13 projects downwardly from the bottom wall 254 near the front  
14 end of the housing 250.

15 BRIEF SUMMARY OF THE INVENTION

16 The present invention provides a housing for  
17 installation in a window frame having a window sash with a  
18 notch defining a pair of opposed edges. The housing  
19 includes side walls, a rear wall, and a top wall extending  
20 beyond the side walls and rear wall to define a flange. A  
21 retainer, such as a protuberance, projects from each of the  
22 side walls. Each retainer has a retaining surface spaced  
23 from the flange for receiving one of the opposed edges  
24 therebetween. The retainer is beveled to define a rearward  
25 camming surface.

26 Preferably, the side walls are provided with plural  
27 retainers for receiving one of the opposed edges between  
28 the retainer and the flange and each being beveled. A rear  
29 protuberance projects from the rear wall and is spaced from  
30 the flange to define a gap for receiving the rear edge of  
31 the notch. The housing also includes a bottom wall and a  
32 retainer projecting from the bottom wall near a front edge  
33 of the bottom wall. A pivot bar or movable bolt projects  
34 from the housing.

1           The invention also includes a window sash assembly. A  
2 sash has a header rail and a stile joined at a corner and  
3 having an opening in the sash. A tilt latch disposed in  
4 the opening includes a housing having side walls, a rear  
5 wall, and a bottom wall. A top wall extends beyond the  
6 side walls and rear wall to define a flange. A retainer  
7 projects from each of the side walls, each retainer having  
8 a retaining surface spaced from the flange for receiving  
9 one of the edges therein. A bolt is movably disposed in  
10 the housing and adapted for engaging a slide channel. Each  
11 retainer is beveled to define a rearward camming surface.

12           BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

13           Fig. 1 shows a perspective view of a double hung  
14 window according to the invention;

15           Fig. 2 shows a perspective view of a tilt latch and  
16 part of a sash of the window;

17           Fig. 3 shows a side elevational view of the tilt  
18 latch;

19           Fig. 4 shows an end view of the latch;

20           Fig. 5 shows a bottom view of the latch with the  
21 bottom cover removed;

22           Fig. 6 shows a top view of the latch;

23           Fig. 7 shows a perspective view of a pivot assembly  
24 and part of the sash;

25           Fig. 8 shows an end view of the pivot assembly;

26           Fig. 9 shows a side view of the pivot assembly; and

27           Figs. 10 and 11 show a prior art tilt latch.

28           DESCRIPTION OF THE INVENTION

29           Referring to Fig. 1, a double hung window assembly 10  
30 includes an upper sash 11 and a lower sash 12 that are  
31 slidable in a window frame 14. The lower sash 12, for  
32 example, includes vertically disposed stiles 16 and  
33 horizontally disposed rails 18 including an upper, header

1 rail and a lower, footer rail. The window frame includes  
2 vertical jambs 20 defining opposed vertical slide channels  
3 22 or tracks. Brake assemblies 24 are slidable in  
4 respective slide channels 22. Lower corners of the sash 12  
5 are provided with pivot assemblies 26 that are associated  
6 with respective brake assemblies 24 to define pivot and  
7 brake assemblies. The brake assemblies 24 are supported by  
8 respective counterbalances, such as balance springs 28  
9 disposed in the slide channels 22. Tilt latches 30 are  
10 disposed in upper corners of the sash 12 for releasably  
11 retaining the upper end of the sash in the slide channels  
12 22.

13 Referring to Fig. 2, an opening 32 is cut in the sash  
14 12 for receiving the tilt latch 30 therein. The opening 32  
15 includes a slot 34 in the header rail 18 defined by opposed  
16 edges 36 blending into a U-shaped rear edge 38. The  
17 opening also includes a slot 40 in the stile 16 defined by  
18 opposed edges 42 and a bottom edge 44. The edges 36 of the  
19 header slot 34 meet the edges 42 of the stile slot 40 so  
20 that the opening 32 is continuous.

21 The tilt latch 30 includes a housing 50 and a movable  
22 bolt 52 projecting therefrom. The housing 50 is sized to  
23 fit in the opening 32 so that the bolt 52 extends outwardly  
24 from the stile 16.

25 Referring to Figs. 3 and 4, the housing 50 includes a  
26 bottom wall 54, side walls 56, a rear wall 58, and a top  
27 wall 60 defining a hollow cavity 62 opening at a front end  
28 of the housing. The top wall 60 defines a flange 64 at the  
29 top of the side and rear walls 56, 58. A plurality of  
30 retainers 65 are provided at the side walls. The retainers  
31 65 are beveled in two directions. Each retainer is  
32 vertically flared, that is, the retainer slopes outwardly  
33 in an upward direction and intersects an engagement surface  
34 67 to define a lip 69 spaced from the flange 64. The  
35 engagement surface 67 is generally perpendicular to the  
36 side wall 56, but preferably slopes slightly downwardly.  
37 Preferably, the upward slope defines an arcuate vertical

camming surface 66 having an increasing slope. Each retainer also slopes outwardly in a forward direction to define a rearward camming surface 68 from the side wall 56 to a point on the lip 69. The number and spacing of the retainers 65 depend on the dimensions of the window sash and housing. One or more protuberances 72 or rear flanges project from the rear wall 58 and have a lip 74 or face spaced from the flange 64 to define a gap 75.

Referring to Figs. 5 and 6, the bolt 52 is slidably disposed in the cavity 62 of the housing. A spring 76 biases the bolt 52 forwardly to an extended position. A post 78 extends between the top and bottom walls 60, 54 through a slot 80 of the bolt 52 and limits forward travel of the bolt. The post 78 can provide for securing upper and lower components of the housing. When the housing is a single piece, the post can be omitted. A knob 88 provided on the top surface of the bolt 52 projects through a slot 90 in the top wall 60 of the housing. A nose 89 of the bolt is adapted for engaging in the slide channel 22 (Fig. 1) for retaining the sash in the window frame. The sash is releasable by use of the knob 88 to retract the bolt 52 thereby disengaging the nose 89 from the channel 22.

Referring to Fig. 2, the tilt latch 30 is installed in the sash 12. The rear end of the housing 50 is placed adjacent the opening 32 in the stile 16. The housing 50 is moved longitudinally so that the rearward camming surfaces 68 of the rear retainers 65 spread the edges 42 and/or force the retainers 65 inwardly by flexing the side walls 56, thus allowing the retainer to pass through the slot 40. The edges 36 of the slot 34 are received between the retainers 65 and the flange 64 near the rear end of the housing. As the housing 50 is moved longitudinally, the front retainers 65 pass through the slot similarly to the rear retainers and the edges are received between the retainers 65 and the flange 64 until the rear wall 58 engages the rear edge 38 and the retainer 70 engages behind the wall of the stile 16 adjacent the bottom edge 44. The

1 rear edge 38 is received in the rear gap 75. The retainers  
2 engage the edges 36 along portions of the length of the  
3 slot 34 providing a snug fit.

4 The tilt latch can also be installed according to an  
5 alternative installation method (not shown). The rear wall  
6 58 of the housing 50 is placed against the rear edge 38 of  
7 the slot 34 so that the rear edge 38 is received in the  
8 rear gap 75. The front end of the housing 50, near the  
9 projecting nose 89, is then forced downwardly. The  
10 downward camming surfaces 66 spread the edges 36 and/or  
11 force the retainers 65 inwardly by flexing the side walls  
12 56, thus allowing the retainers to pass through the slot  
13 34. The retainers 65 move past the edges 36 so that the  
14 edges 36 are received between the retainers 65 and the  
15 flange 64. The retainers 65 engage the edges 36 along  
16 portions of the length of the slot 34 providing a snug fit.  
17 The retainer 70 engages behind the wall of the stile 16  
18 adjacent the bottom edge 44.

19 Referring to Figs. 7, 8 and 9, the pivot assembly 26  
20 includes a housing 132 with a pivot bar 134 located  
21 therein. The housing 132 includes a body 136 having a  
22 longitudinal bore 138. The bore 138 shown is generally  
23 rectangular, but other shapes are suitable as is apparent  
24 from the following description of the pivot bar 134. The  
25 bore 138 is stepped, that is, different parts of the bore  
26 have different cross-sectional dimensions and shapes. One  
27 end of the bore defines a mouth 140 slightly wider than the  
28 pivot bar 134 to facilitate installation and allow slight  
29 flexing thereof. A main part 142 of the bore is sized to  
30 snugly retain the pivot bar 134 therein. Another end of  
31 the bore is circular in cross section and defines a stop  
32 144 against which the pivot bar 134 abuts. Adjacent the  
33 stop, a bottom wall is recessed to define a lip 146. The  
34 pivot bar 134 has a U-shaped cross section of formed metal.  
35 One end of the pivot bar is provided with laterally  
36 extending flanges 148. A detent (not shown) projects from  
37 a bottom wall of the pivot bar near another end. The pivot

1 bar 134 is located within the bore 138 of the housing 132  
2 so that the pivot bar detent engages behind the lip 146 to  
3 prevent longitudinal movement of the pivot bar in one  
4 direction. An end of the pivot bar 134 engages the stop  
5 144 to prevent longitudinal movement of the pivot bar in  
6 another direction. The pivot bar projects from the housing  
7 132 so that the flanges are spaced from the housing.

8 Referring to Fig. 7, the lower end of the sash stile  
9 16 is provided with a notch 149 or slot to allow passage of  
10 the pivot housing 132 therethrough. A second notch 150 or  
11 slot is cut in a lower wall of the lower rail 18 to define  
12 a pair of opposed edges 151. The second notch 150 is as  
13 long as the housing 132.

14 Referring to Figs. 8 and 9, the housing 132 includes a  
15 top wall 154, side walls 156, a rear wall 158, and a bottom  
16 wall 160. The bottom wall 160 defines a flange 164 at the  
17 bottom of the side and rear walls 156, 158. A plurality of  
18 retainers 165 are provided at the side walls. The  
19 retainers 165 are beveled in two directions. Each retainer  
20 slopes outwardly in a downward direction and intersects an  
21 engagement surface 167 to define a lip 169 spaced from the  
22 flange 164. The engagement surface 167 is generally  
23 perpendicular to the side wall 156, but preferably slopes  
24 slightly upwardly. Preferably, the downward slope defines  
25 an arcuate vertical camming surface 166 having an  
26 increasing slope. Each retainer also slopes outwardly in a  
27 forward direction to define a rearward camming surface 168  
28 from the side wall 156 to a point on the lip 169. The  
29 number and spacing of the retainers 165 depend on the  
30 dimensions of the window sash and housing. One or more  
31 protuberances 172 or rear flanges project from the rear  
32 wall 158 and have a lip 174 or face spaced from the flange  
33 164 to define a gap 175. A retainer 170 projects from the  
34 top of the body near one end. The pivot assembly 26 is  
35 installed similarly to the tilt latch as described above  
36 with reference to Fig. 2.

1       The present disclosure describes several embodiments  
2 of the invention, however, the invention is not limited to  
3 these embodiments. Other variations are contemplated to be  
4 within the spirit and scope of the invention and appended  
5 claims.

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